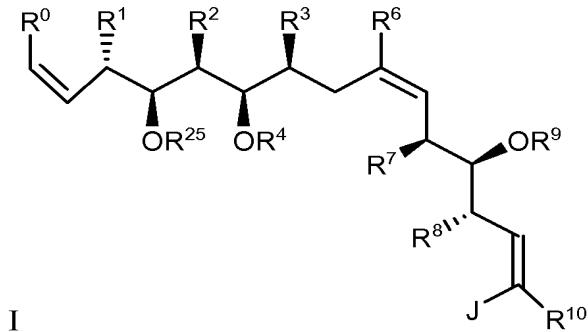


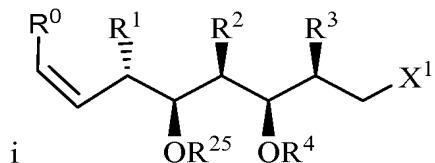
This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

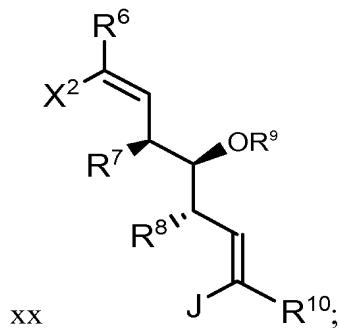
1. (Currently Amended) A process for synthesizing a compound of formula I



comprising contacting a compound of formula i



with a compound of formula xx

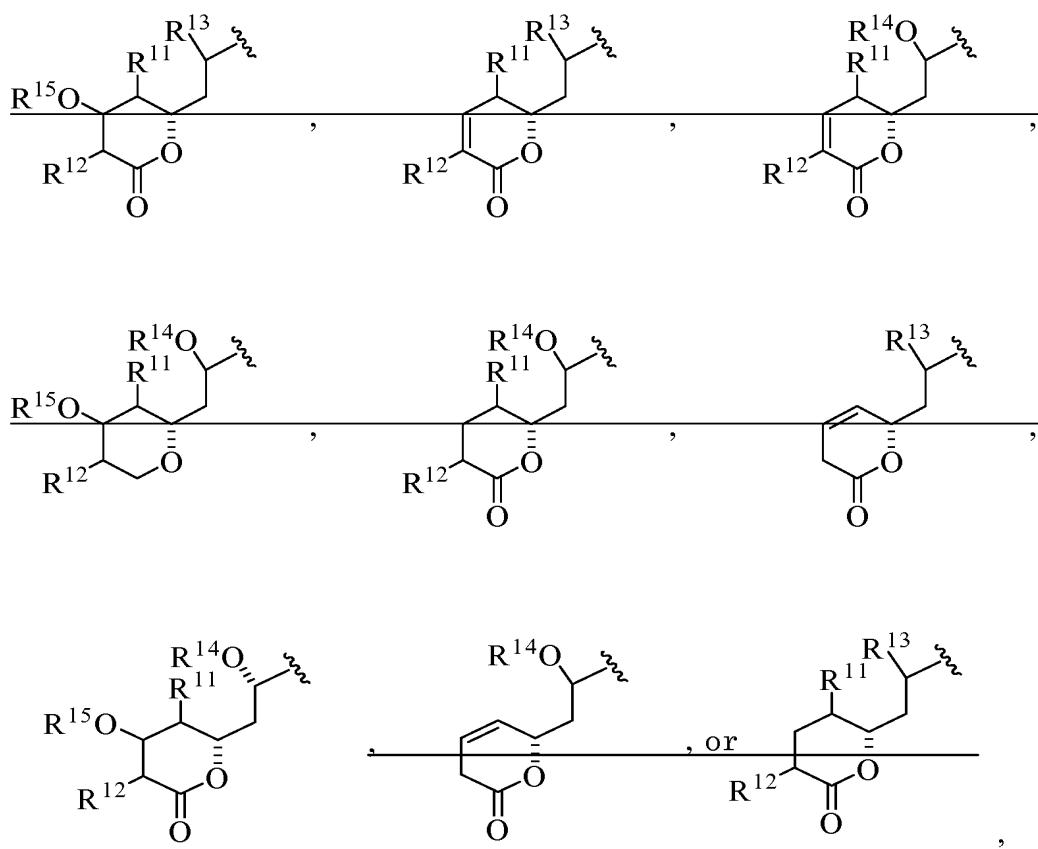


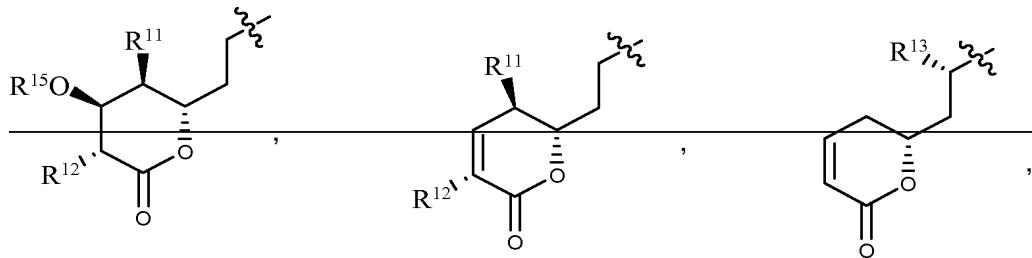
in the presence of a catalytically effective amount of a cross-coupling metal catalyst;

wherein

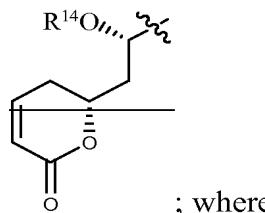
$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  $(CH_2)_r$ (aryl)  
or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup>, R<sup>6</sup>, R<sup>7</sup>, and R<sup>8</sup> are, independently, H or C<sub>1</sub>-C<sub>10</sub> alkyl;  
R<sup>6</sup>, R<sup>7</sup>, and R<sup>8</sup> are, independently, C<sub>1</sub>-C<sub>10</sub> alkyl;  
R<sup>4</sup> and R<sup>9</sup> are, independently, H or an acid labile hydroxyl protecting group;  
R<sup>10</sup> is hydrogen or C<sub>4</sub>-C<sub>6</sub> alkyl;  
R<sup>25</sup> is hydrogen or an oxidation labile hydroxyl protecting group;  
X<sup>1</sup> and X<sup>2</sup> are is, independently, a halogen, triflate, tosylate, or mesylate; and  
J is





or



; wherein

$R^{11}[[.]]$  and  $R^{12}$  and  $R^{13}$  are each independently H or  $C_1-C_{10}$  alkyl; and  
 $R^{14}$  and  $R^{15}$  are, independently, H or an acid labile hydroxyl protecting group.

2. (Canceled)
3. (Currently Amended) The process of claim 1[[2]], wherein the cross-coupling metal catalyst comprises nickel or palladium.
4. (Currently Amended) The process of claim 1[[2]], wherein the cross-coupling metal catalyst is Pd(0).
5. (Currently Amended) The process of claim 1[[2]], further comprising contacting the compound of formula i with a metallating agent, wherein the metallating agent is a compound containing boron, zinc, tin, magnesium, or aluminum, or a combination thereof.
6. (original) The process of claim 5, wherein the metallating agent is a compound containing boron.
7. (original) The process of claim 5, wherein the metallating agent is MeO-9-BBN.

8. (original) The process of claim 5, wherein the metallating agent is a compound containing zinc.

9. (original) The process of claim 5, wherein the metallating agent is  $ZnCl_2$ .

10. (Currently Amended) The process of claim 1, wherein ~~at least one of~~  $X^1$  and  $X^2$  are iodo.

11. (original) The process of claim 1, wherein  $R^0$  is ethylenyl.

12. (Currently Amended) The process of claim 1, wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ , and  $R^8$  are, independently, ~~H or~~  $C_1$ - $C_3$  alkyl.

13. (original) The process of claim 1, wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ , and  $R^8$  are  $CH_3$ .

14. (original) The process of claim 1, wherein  $R^4$  and  $R^9$ , independently, are *tert*-butyldimethylsilyl, triethylsilyl, methoxymethyl, methylthiomethyl, 2-methoxyethoxymethyl, acetyl, benzyloxymethyl, 2-(trimethylsilyl)ethoxymethyl or allyl.

15. (original) The process of claim 1, wherein  $R^4$  is *tert*-butyldimethylsilyl.

16. (original) The process of claim 1, wherein  $R^9$  is methoxymethyl.

17. (original) The process of claim 1, wherein  $R^{10}$  is  $CH_3$ .

18. (original) The process of claim 1, wherein  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are  $CH_3$ .

19. (original) The process of claim 1, wherein  $R^{14}$  and  $R^{15}$  are, independently, *tert*-butyldimethylsilyl, triethylsilyl, methoxymethyl, methylthiomethyl, 2-methoxyethoxymethyl, acetyl, benzyloxymethyl, 2-(trimethylsilyl)ethoxymethyl or allyl.

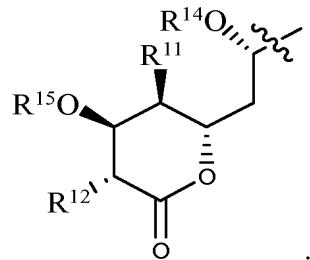
20. (original) The process of claim 1, wherein  $R^{14}$  and  $R^{15}$  are, independently, *tert*-butyldimethylsilyl or methoxymethyl.

21. (original) The process of claim 1, wherein R<sup>25</sup> is *para*-methoxybenzyl.

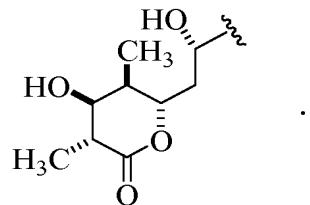
22. (Canceled)

23. (Canceled)

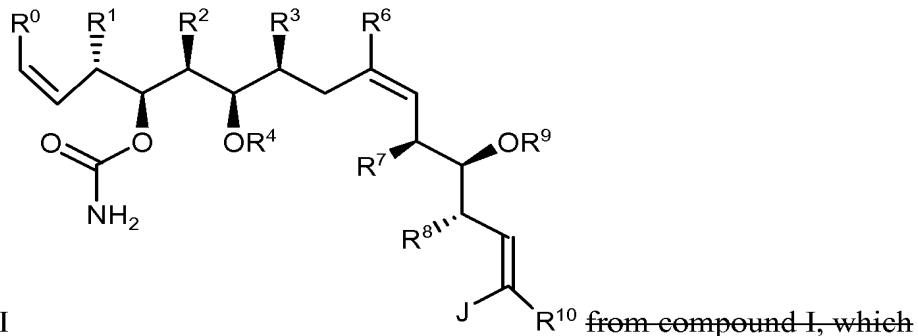
24. (original) The process of claim 1, wherein J is



25. (original) The process of claim 1, wherein J is



26. (Currently Amended) The process of claim 1, further comprising a step of synthesizing a compound of formula II



comprises comprising

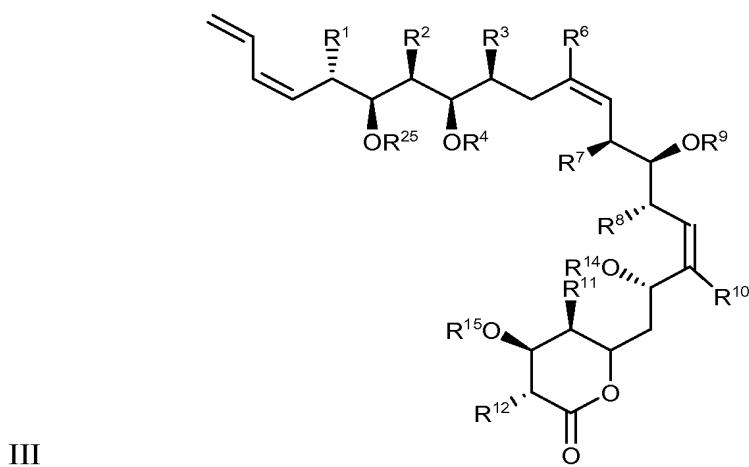
contacting the compound of formula I with an oxidizing agent to form a deprotected compound, and

contacting the deprotected compound with Cl<sub>3</sub>CCONCO and hydrolyzing the resultant imide to form the compound of formula II in the presence of a hydrolyzing agent.

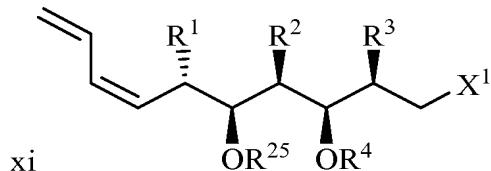
27. (original) The process of claim 26, wherein the oxidizing agent is 2,3-dichloro-5,6-dicyano-1,4-benzoquinone.

28. (Currently Amended) The process of claim 26, wherein the hydrolysis of the imide is carried out in the presence of hydrolyzing agent is Al<sub>2</sub>O<sub>3</sub>.

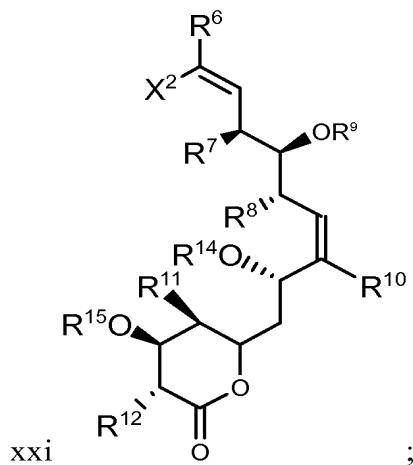
29. (Withdrawn) A process for synthesizing a compound of formula III



comprising contacting a diene of formula xi



with a lactone of formula xxi



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>11</sup>, and R<sup>12</sup> are, independently, H or C<sub>1</sub>-C<sub>10</sub> alkyl;

R<sup>4</sup>, R<sup>9</sup>, R<sup>14</sup>, and R<sup>15</sup> are, independently, an acid labile hydroxyl protecting group; and

group;

R<sup>10</sup> is hydrogen or C<sub>1</sub>-C<sub>6</sub> alkyl;

R<sup>25</sup> is hydrogen or an oxidation stable hydroxyl protecting group; and

X<sup>1</sup> and X<sup>2</sup> are, independently, a halogen, triflate, tosylate, or mesylate.

30. (Withdrawn) The process of claim 29, further comprising

subjecting the process to the presence of a catalytically effective amount of a cross-coupling metal catalyst.

31. (Withdrawn) The process of claim 29, wherein the cross-coupling metal catalyst comprises nickel or palladium.

32. (Withdrawn) The process of claim 29, wherein the cross-coupling metal catalyst is Pd(0).

33. (Withdrawn) The process of claim 29, further comprising contacting the compound of formula xi with a metallating agent, wherein the metallating agent is a compound containing boron, zinc, tin or magnesium or aluminum.

34. (Withdrawn) The process of claim 33, wherein the metallating agent is a compound containing boron.

35. (Withdrawn) The process of claim 33, wherein the metallating agent is MeO-9-BBN.

36. (Withdrawn/Previously Presented) The process of claim 33, wherein the metallating agent is a compound containing zinc.

37. (Withdrawn) The process of claim 33, wherein the metallating agent is ZnCl<sub>2</sub>.

38. (Withdrawn) The process of claim 29, wherein at least one of X<sup>1</sup> and X<sup>2</sup> are iodine.

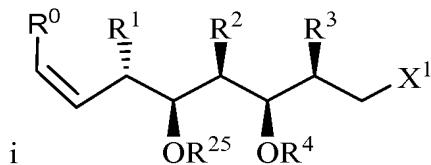
39. (Withdrawn) The process of claim 29, wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>11</sup>, and R<sup>12</sup> are methyl.

40. (Withdrawn) The process of claim 29, wherein R<sup>4</sup>, R<sup>9</sup>, R<sup>14</sup>, and R<sup>15</sup> are, independently, *tert*-butyldimethylsilyl or methoxymethyl.

41. (Withdrawn) The process of claim 29, wherein R<sup>10</sup> is hydrogen.

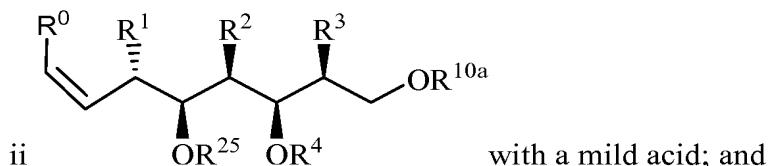
42. (Withdrawn) The process of claim 29, wherein R<sup>25</sup> is *para*-methoxy benzyl.

43. (Withdrawn) A process for synthesizing a halogenated alkylene of formula i



comprising:

contacting an alkenyl of formula ii



adding to the process  $(\text{X}^1)_2$  in the presence of  $\text{P}(\text{R}^{18})_3$ ; wherein:

$\text{R}^0$  is  $\text{C}_1\text{-}\text{C}_6$  alkyl,  $\text{C}_2\text{-}\text{C}_6$  alkenyl,  $\text{C}_2\text{-}\text{C}_6$  alkynyl,  $(\text{CH}_2)_r(\text{C}_3\text{-}\text{C}_6$  cycloalkyl),  $(\text{CH}_2)_r(\text{aryl})$

or  $(\text{CH}_2)_r(\text{heterocycle})$ , wherein  $r$  is 0, 1, 2, 3, or 4;

$\text{R}^1, \text{R}^2$ , and  $\text{R}^3$  are, independently, H or  $\text{C}_1\text{-C}_{10}$  alkyl;

$\text{R}^4$  is H or an acid labile hydroxyl protecting group;

$\text{R}^{10a}$  is a hydroxyl protecting group;

$\text{R}^{18}$  is  $\text{C}_6\text{-C}_{14}$  aryl;

$\text{R}^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group; and

$\text{X}^1$  is a halogen, triflate, tosylate, or mesylate.

44. (Withdrawn) The process of claim 43 wherein  $\text{R}^0$  is ethylene.

45. (Withdrawn) The process of claim 43 wherein  $\text{R}^1, \text{R}^2$  and  $\text{R}^3$  are each methyl.

46. (Withdrawn) The process of claim 43 wherein  $\text{R}^4$  is *para*-methoxybenzyl.

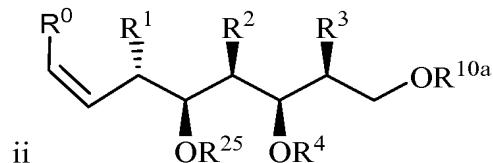
47. (Withdrawn) The process of claim 43 wherein  $\text{R}^{18}$  is phenyl.

48. (Withdrawn) The process of claim 43 wherein  $\text{R}^{25}$  is *tert*-butyldimethylsilyl.

49. (Withdrawn) The process of claim 43 wherein  $\text{X}^1$  is iodo.

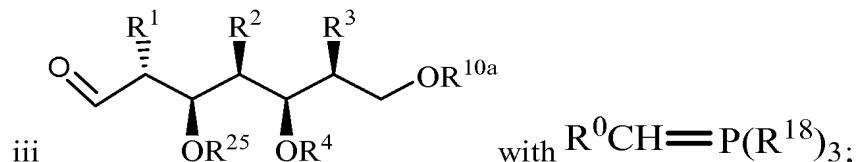
50. (Withdrawn) The process of claim 43, wherein  $R^{10a}$  is trityl.

51. (Withdrawn) A process of synthesizing a compound of formula ii



comprising:

contacting an aldehyde of formula iii



with  $R^0CH=P(R^{18})_3$ ;

wherein

$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  $(CH_2)_r$ (aryl)

or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

$R^1$ ,  $R^2$ , and  $R^3$  are, independently, H or  $C_{1-C_{10}}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group;

$R^{18}$  is  $R^{18}$  is  $C_{6-C_{14}}$  aryl; and

$R^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group.

52. (Withdrawn) The process of claim 51 wherein  $R^0$  is ethylene.

53. (Withdrawn) The process of claim 51 wherein  $R^1$ ,  $R^2$  and  $R^3$  are each methyl.

54. (Withdrawn) The process of claim 51 wherein  $R^4$  is *para*-methoxybenzyl.

55. (Withdrawn) The process of claim 51 wherein  $R^{18}$  is phenyl.

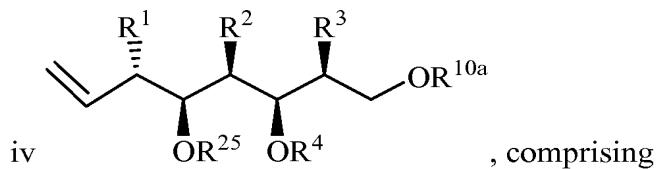
56. (Withdrawn) The process of claim 51 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

57. (Withdrawn) The process of claim 51, wherein  $R^{10a}$  is trityl.

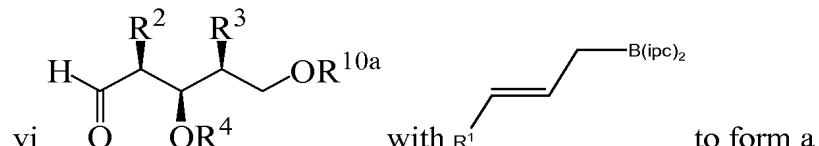
58. (Withdrawn) The process of claim 52, wherein the compound of formula iii is

contacted with allyldiphenylphosphine instead of  $R^0CH=P(R^{18})_3$ .

59. (Withdrawn) A process of synthesizing a compound of formula iv

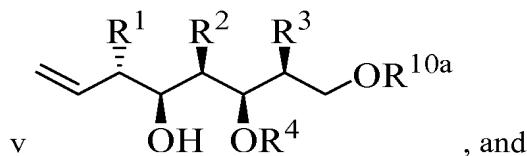


contacting a compound of formula vi



compound of

formula v



reacting a compound of formula v with  $R^{25}O-C(=O)NH-CCl_3$ ; wherein

$R^1$ ,  $R^2$ , and  $R^3$  are, independently, H or  $C_1-C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$R^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group.

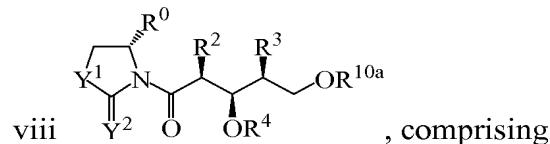
60. (Withdrawn) The process of claim 59 wherein  $R^1$ ,  $R^2$  and  $R^3$  are each methyl.

61. (Withdrawn) The process of claim 59 wherein  $R^4$  is *para*-methoxybenzyl.

62. (Withdrawn) The process of claim 59 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

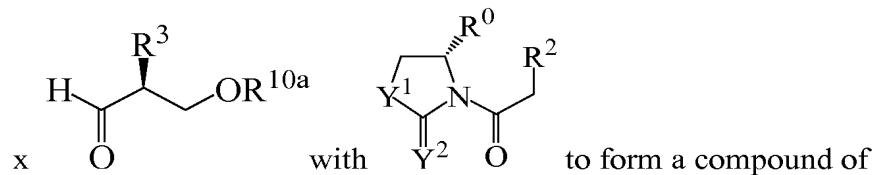
63. (Withdrawn) The process of claim 59, wherein  $R^{10a}$  is trityl.

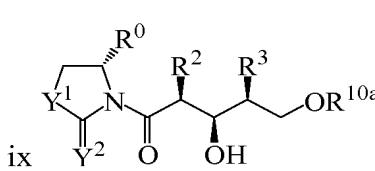
64. (Withdrawn) A process of forming a compound of formula viii



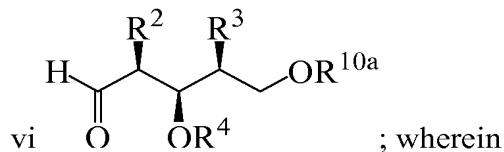
, comprising

contacting a compound of formula x



formula ix  , and

converting the compound of formula ix to a compound of formula vi



$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),

$(CH_2)_r$ (aryl) or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

$R^2$  and  $R^3$  are, independently, H or  $C_1-C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$Y^1$  and  $Y^2$  are, independently, O or S.

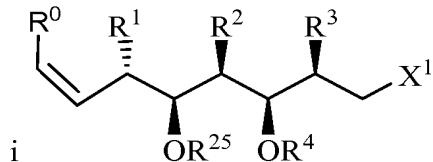
65. (Withdrawn) The process of claim 64 wherein  $R^0$  is benzyl.

66. (Withdrawn) The process of claim 64 wherein  $R^2$  and  $R^3$  are each methyl.

67. (Withdrawn) The process of claim 64 wherein  $R^4$  is *para*-methoxybenzyl.

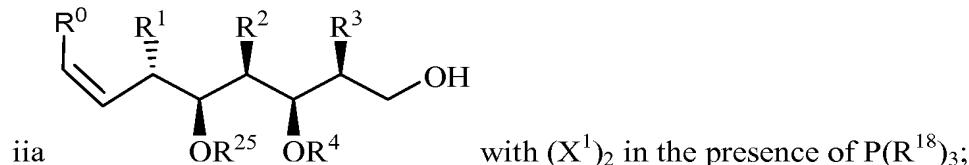
68. (Withdrawn) The process of claim 64 wherein  $R^{10a}$  is trityl.

69. (Withdrawn) A process for synthesizing a halogenated alkylene of formula i



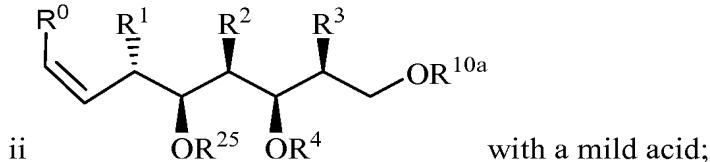
comprising,

contacting an alcohol of formula iiia



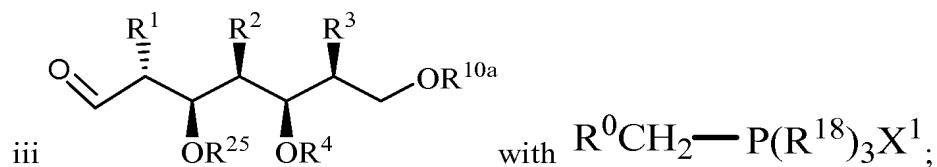
with  $(X^1)_2$  in the presence of  $P(R^{18})_3$ ;

yielding the compound of formula iiia by contacting an alkylene of formula ii



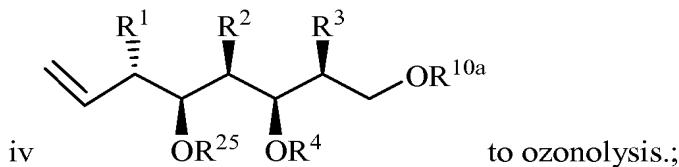
with a mild acid;

forming the compound of formula ii by contacting an aldehyde of formula iii

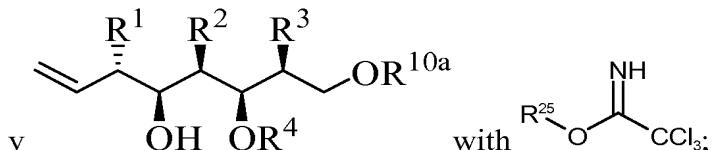


with  $R^0CH_2—P(R^{18})_3X^1$ ;

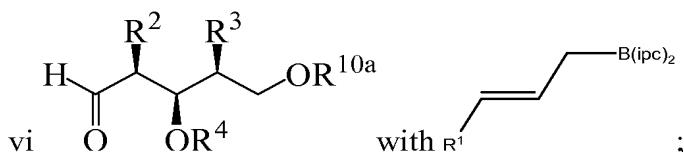
producing the compound of formula iii by subjecting a compound of formula iv



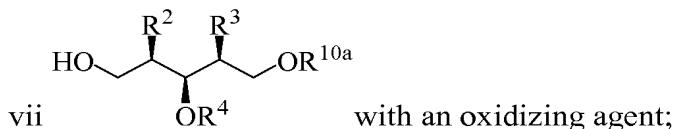
resulting in the compound of formula iv by contacting a compound of formula v



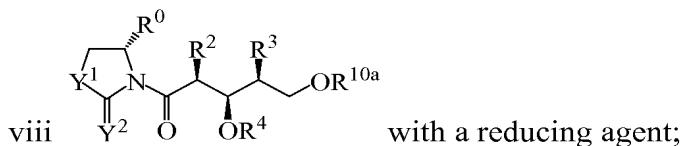
synthesizing the compound of formula v by contacting a compound of formula vi



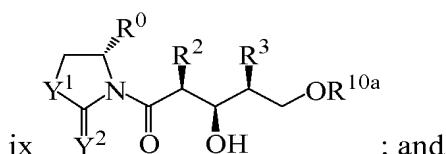
producing the compound of formula vi by contacting a compound of formula vii



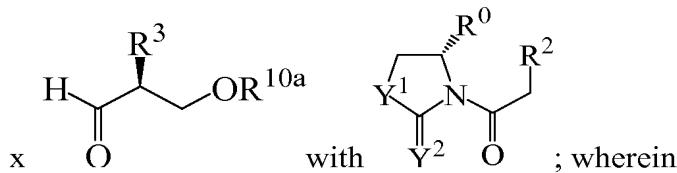
forming the compound of formula vii by contacting a compound of formula viii



synthesizing the compounds of formula viii and by protecting a hydroxyl moiety of a compound of formula ix



yielding the compounds of formula ix and ix' by contacting a compound of formula x



$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  $(CH_2)_r$ (aryl)

or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

$R^1$ ,  $R^2$ , and  $R^3$  are, independently, H or  $C_{1-C_{10}}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group;

$R^{18}$  is  $C_{6-C_{14}}$  aryl;

$R^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group;

$X^1$  is a halogen, triflate, tosylate, or mesylate; and

$Y^1$  and  $Y^2$  are, independently, S or O.

70. (Withdrawn) The process of claim 69 wherein  $R^0$  is benzyl.

71. (Withdrawn) The process of claim 69 wherein  $R^1$ ,  $R^2$  and  $R^3$  are each methyl.

72. (Withdrawn) The process of claim 69 wherein  $R^4$  is *para*-methoxybenzyl.

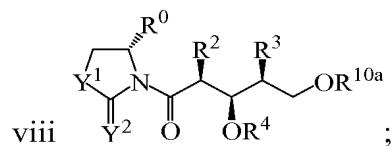
73. (Withdrawn) The process of claim 69 wherein  $R^{18}$  is phenyl.

74. (Withdrawn) The process of claim 69 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

75. (Withdrawn) The process of claim 69 wherein  $X^1$  is iodo.

76. (Withdrawn) The process of claim 69, wherein  $R^{10a}$  is trityl.

77. (Withdrawn) A compound of formula viii



wherein

$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  $(CH_2)_r$ (aryl)

or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

$R^2$  and  $R^3$  are, independently, H or  $C_1-C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$Y^1$  and  $Y^2$  are, independently, S or O.

78. (Withdrawn) The compound of claim 77 wherein  $R^0$  is benzyl.

79. (Withdrawn) The compound of claim 77 wherein  $R^2$  and  $R^3$  are each methyl.

80. (Withdrawn) The compound of claim 77 wherein  $R^4$  is *para*-methoxybenzyl.

81. (Withdrawn) The compound of claim 77 wherein  $R^{10a}$  is trityl.

82. (Withdrawn) The compound of claim 77 wherein at least one of  $Y^1$  and  $Y^2$  is S.

83. (Withdrawn) The compound of claim 77 wherein at least one of  $Y^1$  and  $Y^2$  is O.